Acid Mine Drainage (AMD)

As a result of industrial development (specifically coal mining), acid mine drainage (AMD) is a common water quality concern in many areas of the Pittsburgh District. AMD is the result of water percolating through sub-surface mines rich in sulfides (principally pyrite), which then react with oxygen to form sulfuric acid. The acidic water can have a pH of 5 or less and eventually flows back into surface waters. If left untreated, AMD impacted waters can adversely affect the water quality and aquatic life of receiving waters. Due to mitigation efforts and the exhaustion of pyrite in some mines that have not been in use for decades, AMD water quality conditions have improved throughout the Pittsburgh District as a whole.

Environmental Flows (E-Flows)

It is important to the mission of the Water Quality Team to mimic natural environmental conditions of the tail waters of all USACE (US Army Corps of Engineers) impoundments to minimize our impacts on the environmental quality of affected rivers and streams. In doing so, favorable conditions are maintained from the outflow of the dam, such as ample dissolved oxygen levels and accurate water temperature. These efforts attempt to simulate the natural conditions that support and conserve native populations of life. Many of the multi-purpose dams in the Pittsburgh District have a Congressional authorization for water quality or augmentation, so historically the Pittsburgh District has worked to balance flow and water quality needs. To further this effort, the Pittsburgh District is currently working with The Nature Conservancy and hydro-electric companies to determine how to optimize reservoir operations in the future.

Nutrient overloading (eutrophication)

Nutrient overloading, or eutrophication, is the addition and accumulation of nutrients (such as nitrogen and phosphorus) to an aquatic system. Although eutrophication can be due to natural occurrences, much of the eutrophication in the Pittsburgh District comes from the runoff of agricultural fertilizer, lawn fertilizer, and untreated human sewage (combined sewer overflows). Nutrient overloading can result in high growths of phytoplankton that can lead to harmful algal blooms (HABs), which then impact the rest of the ecosystem and the organisms living in it.

Non-Native Species

Non-Native species disturb ecosystem function by interfering with trophic and competition processes. Within the Pittsburgh District, one of the most prevalent non-native species is the Zebra mussel (Dreissena polymorpha). Zebra mussels influence water quality via nutrient transport and water clarity. Zebra mussels alter the pre-existing food chain when they filter out algae and sediment. With water clarity improved, sunlight is able to penetrate farther into the water column reaching the lake bed in some areas of the lake. Aquatic plant populations begin to increase rapidly causing impacts to recreational use, drinking water, available oxygen, and biological organisms.

Bioaccumulation and biomagnification of contaminants in aquatic organisms (methylmercury, pesticides, metals, etc)

Bioaccumulation is the build-up in an organism of bioavailable chemicals (harmful organic chemicals that can be stored in an organism's tissue). These harmful organic chemicals can enter the organism via respiration, ingestion, or direct contact. Biomagnification is the transfer of these bioaccumulated chemicals up the food chain when predatory organisms eat prey that contains stocks of stored harmful organic chemicals. As a predatory organism consumes its prey, it acquires concentrations of harmful organic chemicals that can harm or kill the organism, as well as any other organisms that consume it (such as humans consuming predatory game fish). Chemicals such as pesticides, methylmercury (bioavailable mercury), and other bioavailable metals can bioaccumulate or biomagnify in lakes and can be a threat to the organisms, the ecosystem, and even humans.